

New Water Pasteurization Technology Saves Lives in Developing Countries

by Jennifer Crites

“Water, water everywhere and not a drop to drink.”

The Ancient Mariner

In a slum near Bombay, India, thirsty children eagerly drink water flowing from a cracked pipe that runs through a sewage-filled ditch. In Cambodia, it's not uncommon for children to get their drinking water from ponds or slow-moving rivers used as a toilet and bathtub by neighbors, cattle and oxen. Diseases and parasites in untreated, sewage-laden water kill more than 3 million people annually—almost all of them children. In India alone, according to the Worldwide Fund for Nature, “every minute, three young children die from drinking dirty water.”

In the last few years, there have been some advances in sanitation education. Many slum dwellers and rural villagers in impoverished third world countries know they should boil water before drinking it, but in many cases, they don't. The cost of kerosene or firewood for boiling can eat up a third of a family's income—money that could otherwise be used to buy food.

Enter John Grandinetti and Rotarian Will Hartzell, president and vice president, respectively, of Honolulu-based Safe Water Systems. A few years ago, Grandinetti, who has spent the last fifteen years developing solar water heating systems, designed a low-cost solar water pasteurizer that eliminates disease-causing, water-borne microbes—99.999% of them, according to tests conducted at the University of Hawaii's Water Resources Research Center.

The device, named Sol*Saver, works on the simple theory of pasteurization but takes it one step further—using the sun's energy—and it does its job without electricity or pumps. Contaminated water is channeled by gravity through a standard solar water-heating panel. The key to the system is a uniquely-designed thermal control valve that keeps the water trapped in the panel until it reaches 175°F / 79°C, a temperature hot enough to destroy any biological microbes that can cause illness. “We made it simple to set up, operate and maintain,” says Hartzell, “because it was developed for remote areas where regular maintenance isn't always available and where it might take months to get replacement parts.”

Tanzania is one such area. Grandinetti traveled to the East African nation in July of 1996 to install five solar pasteurization units for a pilot project sponsored jointly by Lutheran World Relief, two Lutheran churches and Colorado's Greeley Redeye Rotary with support from other Rotary clubs in Greeley; East Haddam, Connecticut; and Stillwater, Minnesota. His first obstacle was rescuing the equipment—which had arrived 40 days earlier—from a bureaucratic customs department in the capital city of Dar es Salaam.

Ten days and \$500 in court costs and warehousing fees later, the cargo was released and on its way to the country's interior where the two systems sponsored by the Rotary clubs were destined for the multi-village, 900-student Okokola Primary School; and Diaconical Centre, a medical dispensary, AIDS counseling and orphan assistance facility in the village of Mto wa Mbu.

The other three units purchased by Lutheran World Relief and the Lutheran churches were to be installed in or near Arusha at the Maasai School for Girls, Dareda Agricultural Development Center (for use as a demonstration and training model) and Selian Lutheran Hospital.

“It’s a very special gift as it allows us to assure our patients that they will not get sick from drinking the water at the hospital,” writes Mark L. Jacobson, M.D., administrator of the Selian Lutheran Hospital, after installation of the solar water pasteurizer. “In our area, very few people have access to any kind of protected water source. Most get their water from surface streams and runoff, and much of it is contaminated. Now we can offer water that is safe to drink. We are supplying all 115 beds in the hospital with drinking water from the single unit.”

Greeley Redeye Rotary World Community Service Committee Chair Hope Cassidy spearheaded the Rotary / Lutheran team effort. At first she considered buying a large, \$15,000 solar cooker that promised to pasteurize 200 liters a day, but when she learned about Sol*Saver (which pasteurizes up to 750 liters a day and costs about than \$2,000) in the December 1995 issue of The Rotarian magazine, she contacted Hartzell, who immediately made plans to transport the systems to Tanzania. “The timing was excellent,” says Cassidy. “The water at Selian Hospital runs with cholera when the autumn rains come.”

According to Cassidy, “Firewood for boiling contaminated water is often not available in Tanzania and other developing countries. When fuel is available, most villagers can’t afford the cost and drink directly from polluted rivers and streams. This new solar technology produces water for less than one cent a gallon and has helped to alleviate enormous suffering.”

This past August, Cassidy returned to Tanzania with Hartzell to monitor the five pilot project sites, collect data, and evaluate the effectiveness of the units. “We checked and corrected any potential problems,” says Hartzell, “and the installed units are doing the job they were sent here to do: make safe drinking water from highly contaminated sources.

He noted that Amos Mapote, administrator of the Diaconical Centre, was especially delighted with the pasteurizer because it generated a surplus that can be distributed to other families in the area, and it helps to inform curious villagers about the benefits of disinfecting their drinking water. “Our neighbors did not believe it would work until they felt that the pipes were hot and saw no fire around,” says Mapote. “We give many seminars and teach people about safe water. It’s good to have an example to show them the difference.”

In addition Rotary clubs and Lutheran World Relief, Grandinetti and Hartzell are also working other groups interested in setting up solar pasteurization systems worldwide. They see Sol*Saver not only as a way to provide clean, safe drinking water for millions of people without the environmentally damaging effects of burning wood or kerosene, but also as an economic opportunity for families in developing countries to break out of the poverty cycle and earn an independent income supplying low-cost pasteurized water to their communities. For more information: Safe Water Systems, 808-539-3937; e-mail: info@safewatersystems.com; Web site: <http://safewatersystems.com>.